

REMARKS

Claims 1-50 are now pending, of which claims 1, 26, 49, and 50 are independent. Claims 1-50 have been rejected under 35 U.S.C. §102 based on U.S. Patent No. 7,043,636 to Smeets. This rejection is respectfully traversed. For the reasons described below, claims 1-50 are in condition for allowance.

Claim Amendments

Independent claims 1, 26, 49, and 50 are amended to state specifically that the claimed approach detects execution of an unidentified software, selects portions of the or executing image of the unidentified software, and uses superfingerprints of protected software to identify the unidentified software. Independent claims 1, 26, 49, and 50 are further amended to require that the executing unidentified software is identified as the protected software using the superfingerprint, even if the executing unidentified software and the protected software are not exactly the same. As described in the background section of the present application, prior methods of software identification relied on the filename as represented in the operating system of the computer, on internal strings in the software, or on the size of the file on disk. Such methods failed to work if the software was changed at all, either for the purposes of deception or innocently. Unlike the prior art, the present invention can identify whether an unidentified software is protected software even though the unidentified software may have been changed innocently or deceptively. Support for this amendment can be found throughout the application, at least at pg. 1, lines 12-19; pg. 2, lines 8-14; pg. 4 – pg. 5, lines 1-20; pg. 8; pg. 14, line 6 - pg. 16, line 26; figs. 5-9. Thus, no new matter is introduced. Acceptance is respectfully requested.

Claim Rejections

Claims 1-50 have been rejected under 35 U.S.C. §102(e) based on Smeets. This rejection is respectfully traversed.

With conventional software authentication schemes, such as the authentication approach discussed in Smeets, protected software is accessed after successful completion of an authentication procedure. Smeets teaches that access to the capability of executing or to the

capability of modifying the protected software is permitted only after the user has passed an authorization procedure. See Smeets, for example, at col. 8, ll. 40-60 and Abstract.

Conversely, the present invention detects executing unidentified software and uses superfingerprints of protected software to identify the unidentified software. Using this approach, the invention can identify the unidentified software even if it has been modified or even if it has been disguised as different software. For example, the present invention can identify software even when an unscrupulous user has embedded it into another, larger software program, to disguise the identity of the software. Smeets' authentication approach does not address this situation; nor does Smeets even contemplate any problems associated with embedding protected software into larger programs.

Consider, for purposes of analogy, an Italian restaurant that has a large collection of recipes. This collection is analogous to the program text on disk. Suppose, however, that one set of items, say pizzas, are the most popular. Then an observer of the kitchen would mostly see the preparation of pizza dough, the insertion of pizza in the oven, and so on. Those are the traces of execution that characterize the restaurant. The result of the execution of that program is a particular pizza. The present invention examines the traces of execution (preparation of the pizza). Smeets by contrast looks at the whole collection of recipes (when talking about static data) or the final values of the pizza (when talking about dynamic data). Thus, because Smeets teaches to use the whole collection of program text (static data) or final values (dynamic data), Smeets does not relate to the claimed approach of selecting portions of the executing software (traces of the executing software) to perform the identification, and thus, Smeets does not disclose the requirements of the claimed invention.

In response to applicants' arguments set forth in the amendment filed December 8, 2006, that Smeets does not teach the inventive approach of software identification including selecting portions of the executing software and performing computations on the selected portions to create superfingerprints, the Examiner states in the final office action dated January 18, 2007, that Smeets does select portions of the executing software to perform authentication. In support of this conclusion, the Examiner cites Smeets at column 5, lines 13-22, "program code implementation" and column 8, lines 40-60, "executing the program code 319 for the hash algorithm hs." As discussed in more detail below, however, neither of these cited sections of

Smeets relates to the inventive approach of selecting specific portions of the executing protected software to create the superfingerprints and perform the identification.

Column 5, lines 13-22, of Smeets that was cited by the Examiner refers to the “program code implementation of the authorization method itself,” and this “program code” for Smeets’ authorization method does *not* relate to the claimed identification approach of selecting portions of executing protected software to create the superfingerprints. In general, when software code is executed by an execution engine, for example, the software code takes a different form in memory than it does stored on disk, and the inventive approach uses select portions of this advantageous executing form, the executing image of the unidentified software, to create the superfingerprints for identification. The claimed technique uses select portions of the protected software execution stream because it advantageously enables more comprehensive and versatile software identification. For example, with the claimed approach, when protected software is loaded from a remote computer as is often the case for java applets, the software takes a different form from when it is stored in the main memory of the computer, and the present invention advantageously identifies the protected software while it is executing. Smeets, however, does not even contemplate identifying software while it is executing.

Moreover, Smeets’s discussion of “program code implementation of the authorization method itself” relates to system code that performs the authentication of the protected software, not the protected software itself. By way of contrast, the claimed invention uses a supervising program to perform the identification, and the supervising program selects specific portions of the executing protected software for identification. Thus, Smeets’s “program code implementation of the authorization method” is system code used to authenticate protected software, and this system code is not the same as the claimed protected software.

With respect to column 8, lines 40-60 of Smeets, although the Examiner is correct that this section does recite the term “executing,” this term is taken out of context because the modifying descriptors before and after the term make it clear that Smeets does not execute the protected software until *after* it has been authenticated. In particular, in this section, Smeets specifically states that “access to the capability of executing the program code . . . Is controlled by an authentication procedure.” Thus, like the prior art, in Smeets the program code cannot be executed unless and until it has been authenticated by an authentication procedure. By way of

contrast, with the claimed invention, execution of the protected software is necessary to perform the identification.

Therefore, it is respectfully requested that the §102 rejection of Claim 1 based on Smeets be reconsidered and withdrawn. For reasons similar to those set forth above with respect to Claim 1, independent Claims 1, 26, 49 and 50, and their respective dependent claims are not disclosed by Smeets. As such, it is respectfully submitted that the §102 rejection of Claims 1-50 be reconsidered and withdrawn.

Interview Summary

A telephone interview was held on March 19, 2007, for the present application. The participants in the telephone interview were Examiner Jeremiah Avery, and Applicants' representatives James M. Smith and Giovanna H. Fessenden. There were no exhibits or demonstratives presented.

The differences between U.S. Patent No. 7,043,636 to Smeets and the present invention were discussed. In particular, the Applicants' representatives explained that Smeets does not relate to the claimed approach for identifying software because Smeets is directed to an approach for authenticating software, not an approach for identifying software, as required by the claimed invention.

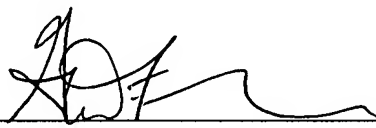
Applicants would like to take this opportunity to thank Examiner Avery for his time and for his suggestions for advancing prosecution of the application. In particular, it was suggested that the approach to identifying software set forth in the claims should be amended to specify that portions of the executing image of the protected software are selected to further distinguish Smeets. As such, independent Claims 1, 26, 49 and 50 are amended by the present amendment to recite this limitation.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Confirmation No.: 7288

For: Detection and Identification Methods for Software

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Sir:

Transmitted herewith is an Amendment for filing in the above-identified application.

- ☐ Small entity status of this application under 37 CFR 1.9 and 1.27 has been established by a Small Entity Statement previously submitted.
- ☐ A Small Entity Statement to establish small entity status under 37 CFR 1.9 and 1.27 is enclosed.

The claims fee has been calculated as shown below:

					SMALL ENTITY		OTHER THAN SMALL ENTITY		
	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NO. PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE	ADDIT. FEE	OR	RATE	ADDIT. FEE
TOTAL	50	MINUS	* 50	0	X \$ 25	\$		X 50	\$
INDEP	4	MINUS	** 4	0	X \$100	\$		X \$200	\$
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEP. CLAIM					+	\$180	\$	+	\$360
					TOTAL = \$ 0			TOTAL = \$ 0	

* not fewer than 20
** not fewer than 3

The Application Size Fee has been calculated as shown below:
(Effective for cases filed on or after December 8, 2004)

Actual Sheets (Including current amendment)	Highest No. of Sheets Paid For (At least 100)	No. of Additional Units Required (Increments of 50 sheets)	SMALL ENTITY		OTHER THAN SMALL ENTITY		Payment Sufficient for up to [] Sheets
			Rate	Total Amount Owed	Rate	Total Amount Owed	
			X \$125	\$[]	X \$250	\$[]	

Petition for Extension of Time

- ☐ Applicant hereby petitions to extend the time to respond to the [] dated [] for [] month(s) from [] to []. The appropriate fee is set forth below.
- ☒ The undersigned attorney petitions the Commissioner for Patents to extend the time for filing a Notice of Appeal in reply to the Office Action made Final dated January 18, 2007 for one (1) month, from April 18, 2007 to May 18, 2007 under 37 C.F.R. § 1.136(a).

In lieu of filing a Notice of Appeal, Applicants' Attorney is filing a Request for Continued Examination concurrently herewith.

The claims fee has been calculated as shown below:

					SMALL ENTITY		OTHER THAN SMALL ENTITY		
	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NO. PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE	ADDIT. FEE	OR	RATE	ADDIT. FEE
TOTAL	50	MINUS	* 50	0	X \$25	\$		X 50	\$
INDEP	4	MINUS	** 4	0	X \$100	\$		X \$200	\$
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEP. CLAIM					+	\$180	\$	+	\$360
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Actual Sheets (Including current amendment)	Highest No. of Sheets Paid For (At least 100)	No. of Additional Units Required (Increments of 50 sheets)	SMALL ENTITY		OTHER THAN SMALL ENTITY		Payment Sufficient for up to [] Sheets
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